Other Attachment File(s)

*** Mandatory Other Attachment Filename:** 1235-2021 Saint Regis Mohawk Tribe Indirect Rate.

Add Mandatory Other Attachment | Delete Mandatory Other Attachment | View Mandatory Other Attachment

To add more "Other Attachment" attachments, please use the attachment buttons below.

Add Optional Other Attachment | Delete Optional Other Attachment | View Optional Other Attachment

OMB Number: 2030-0020
Expiration Date: 06/30/2024

Preaward Compliance Review Report for All Applicants and Recipients Requesting EPA Financial Assistance

Note: Read Instructions before completing form.

I. A. Applicant/Recipient (Name, Address, City, State, Zip Code)

Name: Saint Regis Mohawk Tribe

Address: 71 Margaret Terrance Memorial Way

City: Akwesasne

State: [ ] Zip Code: 13655-3236

B. DUNS No. 797816647

II. Is the applicant currently receiving EPA Assistance? ☒ Yes ☐ No

III. List all civil rights lawsuits and administrative complaints pending against the applicant/recipient that allege discrimination based on race, color, national origin, sex, age, or disability. (Do not include employment complaints not covered by 40 C.F.R. Parts 5 and 7.)

N/A

IV. List all civil rights lawsuits and administrative complaints decided against the applicant/recipient within the last year that allege discrimination based on race, color, national origin, sex, age, or disability and enclose a copy of all decisions. Please describe all corrective actions taken. (Do not include employment complaints not covered by 40 C.F.R. Parts 5 and 7.)

N/A

V. List all civil rights compliance reviews of the applicant/recipient conducted by any agency within the last two years and enclose a copy of the review and any decisions, orders, or agreements based on the review. Please describe any corrective action taken. (40 C.F.R. § 7.80(c)(3))

N/A

VI. Is the applicant requesting EPA assistance for new construction? If no, proceed to VII; if yes, answer (a) and/or (b) below.

☐ Yes ☒ No

a. If the grant is for new construction, will all new facilities or alterations to existing facilities be designed and constructed to be readily accessible to and usable by persons with disabilities? If yes, proceed to VII; if no, proceed to VI(b).

☐ Yes ☐ No

b. If the grant is for new construction and the new facilities or alterations to existing facilities will not be readily accessible to and usable by persons with disabilities, explain how a regulatory exception (40 C.F.R. 7.70) applies.

VII. Does the applicant/recipient provide initial and continuing notice that it does not discriminate on the basis of race, color, national origin, sex, age, or disability in its program or activities? (40 C.F.R 5.140 and 7.95)	☒ Yes	☐ No
a. Do the methods of notice accommodate those with impaired vision or hearing?	☐ Yes	☒ No
b. Is the notice posted in a prominent place in the applicant's offices or facilities or, for education programs and activities, in appropriate periodicals and other written communications?	☒ Yes	☐ No
c. Does the notice identify a designated civil rights coordinator?	☐ Yes	☒ No
VIII. Does the applicant/recipient maintain demographic data on the race, color, national origin, sex, age, or handicap of the population it serves? (40 C.F.R. 7.85(a))	☐ Yes	☒ No
IX. Does the applicant/recipient have a policy/procedure for providing access to services for persons with limited English proficiency? (40 C.F.R. Part 7, E.O. 13166)	☐ Yes	☒ No

X. If the applicant is an education program or activity, or has 15 or more employees, has it designated an employee to coordinate its compliance with 40 C.F.R. Parts 5 and 7? Provide the name, title, position, mailing address, e-mail address, fax number, and telephone number of the designated coordinator.

No

XI. If the applicant is an education program or activity, or has 15 or more employees, has it adopted grievance procedures that assure the prompt and fair resolution of complaints that allege a violation of 40 C.F.R. Parts 5 and 7? Provide a legal citation or Internet Address for, or a copy of, the procedures.

No

For the Applicant/Recipient

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law. I assure that I will fully comply with all applicable civil rights statutes and EPA regulations.

A. Signature of Authorized Official	B. Title of Authorized Official	C. Date
Lawrence Swamp	Tribal Chief	03/23/2022

For the U.S. Environmental Protection Agency

I have reviewed the information provided by the applicant/recipient and hereby certify that the applicant/recipient has submitted all preaward compliance information required by 40 C.F.R. Parts 5 and 7; that based on the information submitted, this application satisfies the preaward provisions of 40 C.F.R. Parts 5 and 7; and that the applicant has given assurance that it will fully comply with all applicable civil rights statures and EPA regulations.

A. *Signature of Authorized EPA Official	B. Title of Authorized Official	C. Date

*** See Instructions**

Instructions for EPA FORM 4700-4 (Rev. 06/2014)

General. Recipients of Federal financial assistance from the U.S. Environmental Protection Agency must comply with the following statutes and regulations.
Title VI of the Civil Rights Acts of 1964 provides that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. The Act goes on to explain that the statute shall not be construed to authorize action with respect to any employment practice of any employer, employment agency, or labor organization (except where the primary objective of the Federal financial assistance is to provide employment). Section 13 of the 1972 Amendments to the Federal Water Pollution Control Act provides that no person in the United States shall on the ground of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under the Federal Water Pollution Control Act, as amended. Employment discrimination on the basis of sex is prohibited in all such programs or activities. Section 504 of the Rehabilitation Act of 1973 provides that no otherwise qualified individual with a disability in the United States shall solely by reason of disability be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. Employment discrimination on the basis of disability is prohibited in all such programs or activities. The Age Discrimination Act of 1975 provides that no person on the basis of age shall be excluded from participation under any program or activity receiving Federal financial assistance. Employment discrimination is not covered. Age discrimination in employment is prohibited by the Age Discrimination in Employment Act administered by the Equal Employment Opportunity Commission. Title IX of the Education Amendments of 1972 provides that no person in the United States on the basis of sex shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance. Employment discrimination on the basis of sex is prohibited in all such education programs or activities. Note: an education program or activity is not limited to only those conducted by a formal institution. 40 C.F.R. Part 5 implements Title IX of the Education Amendments of 1972. 40 C.F.R. Part 7 implements Title VI of the Civil Rights Act of 1964, Section 13 of the 1972 Amendments to the Federal Water Pollution Control Act, and Section 504 of The Rehabilitation Act of 1973. The Executive Order 13166 (E.O. 13166) entitled; "Improving Access to Services for Persons with Limited English Proficiency" requires Federal agencies work to ensure that recipients of Federal financial assistance provide meaningful access to their LEP applicants and beneficiaries.

Items "Applicant" means any entity that files an application or unsolicited proposal or otherwise requests EPA assistance. 40 C.F.R. §§ 5.105, 7.25. "Recipient" means any entity, other than applicant, which will actually receive EPA assistance. 40 C.F.R. §§ 5.105, 7.25. "Civil rights lawsuits and administrative complaints" means any lawsuit or administrative complaint alleging discrimination on the basis of race, color, national origin, sex, age, or disability pending or decided against the applicant and/or entity which actually benefits from the grant, but excluding employment complaints not covered by 40 C.F.R. Parts 5 and 7. For example, if a city is the named applicant but the grant will actually benefit the Department of Sewage, civil rights lawsuits involving both the city and the Department of Sewage should be listed. "Civil rights compliance review" means any review assessing the applicant's and/or recipient's compliance with laws prohibiting discrimination on the basis of race, color, national origin, sex, age, or disability. Submit this form with the original and required copies of applications, requests for extensions, requests for increase of funds, etc. Updates of information are all that are required after the initial application submission. If any item is not relevant to the project for which assistance is requested, write "NA" for "Not Applicable." In the event applicant is uncertain about how to answer any questions, EPA program officials should be contacted for clarification. * Note: Signature appears in the Approval Section of the EPA Comprehensive Administrative Review For Grants/Cooperative Agreements & Continuation/Supplemental Awards form.

EPA KEY CONTACTS FORM

OMB Number: 2030-0020
Expiration Date: 06/30/2024

Authorized Representative: *Original awards and amendments will be sent to this individual for review and acceptance, unless otherwise indicated.*

Name: Prefix: Mr. First Name: Ron Middle Name:
Last Name: LaFrance Suffix: Jr.

Title: Tribal Chief

Complete Address:

Street1: 71 Margaret Terrance Memorial Way
Street2:
City: Akwesasne State: NY: New York
Zip / Postal Code: 13655-3236 Country: USA: UNITED STATES

Phone Number: 5183582272 **Fax Number:**

E-mail Address: tribal.grants@srmt-nsn.gov

Payee: *Individual authorized to accept payments.*

Name: Prefix: Ms. First Name: Heather Middle Name:
Last Name: Henry Suffix:

Title: Assistant CFO

Complete Address:

Street1: 71 Margaret Terrance Memorial Way
Street2:
City: Akwesasne State: NY: New York
Zip / Postal Code: 13655-3236 Country: USA: UNITED STATES

Phone Number: 518.358.2272 **Fax Number:**

E-mail Address: heather.henry@srmt-nsn.gov

Administrative Contact: *Individual from Sponsored Programs Office to contact concerning administrative matters (i.e., indirect cost rate computation, rebudgeting requests etc).*

Name: Prefix: Ms. First Name: Gloria Middle Name:
Last Name: Herne Suffix:

Title: Assistant Executive Director

Complete Address:

Street1: 71 Margaret Terrance Memorial Way
Street2:
City: Akwesasne State: NY: New York
Zip / Postal Code: 13655-3236 Country: USA: UNITED STATES

Phone Number: 518.358.2272 **Fax Number:**

E-mail Address: gloria.herne@srmt-nsn.gov

EPA Form 5700-54 (Rev 4-02)

EPA KEY CONTACTS FORM

Project Manager: *Individual responsible for the technical completion of the proposed work.*

Name: Prefix: Mr. First Name: Tony Middle Name:

Last Name: David Suffix:

Title: Director

Complete Address:

Street1: 71 Margaret Terrance Memorial Way

Street2:

City: Akwesasne State: NY: New York

Zip / Postal Code: 13655-3236 Country: USA: UNITED STATES

Phone Number: 518.358.5937 **Fax Number:**

E-mail Address: tony.david@srmt-nsn.gov

Project Narrative File(s)

*** Mandatory Project Narrative File Filename:** 1234-Sensor Deployment SRMT 03 22 22 Final.pdf

Add Mandatory Project Narrative File | Delete Mandatory Project Narrative File | View Mandatory Project Narrative File

To add more Project Narrative File attachments, please use the attachment buttons below.

Add Optional Project Narrative File | Delete Optional Project Narrative File | View Optional Project Narrative File

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 02/28/2022

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. SRMY-Advancing Ambient Air Quality Monitoring in NY Tribal Nations	66.034	$	$	$ 381,729.00	$	$ 381,729.00
2.						
3.						
4.						
5. Totals		$	$	$ 381,729.00	$	$ 381,729.00

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SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1)	(2)	(3)	(4)	Total (5)
	SRMY-Advancing Ambient Air Quality Monitoring in NY Tribal Nations				
a. Personnel	$ 116,957.00	$	$	$	$ 116,957.00
b. Fringe Benefits	20,469.00				20,469.00
c. Travel	3,500.00				3,500.00
d. Equipment	37,500.00				37,500.00
e. Supplies	5,700.00				5,700.00
f. Contractual	149,500.00				149,500.00
g. Construction	0.00				0.00
h. Other	10,586.00				10,586.00
i. Total Direct Charges (sum of 6a-6h)	344,212.00				$ 344,212.00
j. Indirect Charges	37,517.00				$ 37,517.00
k. TOTALS (sum of 6i and 6j)	$ 381,729.00	$	$	$	$ 381,729.00
7. Program Income	$	$	$	$	$

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SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8. SRMY-Advancing Ambient Air Quality Monitoring in NY Tribal Nations	$	$	$	$
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$	$	$	$

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 381,729.00	$ 95,432.00	$ 95,432.00	$ 95,432.00	$ 95,433.00
14. Non-Federal	$				
15. TOTAL (sum of lines 13 and 14)	$ 381,729.00	$ 95,432.00	$ 95,432.00	$ 95,432.00	$ 95,433.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. SRMY-Advancing Ambient Air Quality Monitoring in NY Tribal Nations	$	$	$	$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	$	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: $344,212

22. Indirect Charges: $37,517 @20.59%

23. Remarks:

OMB Number: 4040-0004
Expiration Date: 12/31/2022

Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: 03/23/2022

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: SAINT REGIS MOHAWK TRIBE

* b. Employer/Taxpayer Identification Number (EIN/TIN): 16-1007650

* c. Organizational DUNS: 7978166470000

d. Address:

* Street1: 71 Margaret Terrance Memorial Way
Street2:
* City: Akwesasne
County/Parish:
* State: NY: New York
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 13655-3236

e. Organizational Unit:

Department Name:

Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: Ms.
* First Name: Angela
Middle Name:
* Last Name: Benedict
Suffix:

Title: Program Manager

Organizational Affiliation: St. Regis Mohawk Tribe

* Telephone Number: 518.358.5937
Fax Number:

* Email: angela.benedict@srmt-nsn.gov

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

I: Indian/Native American Tribal Government (Federally Recognized)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Environmental Protection Agency

11. Catalog of Federal Domestic Assistance Number:

66.034

CFDA Title:

Surveys, Studies, Research, Investigations, Demonstrations, and Special Purpose Activities Relating to the Clean Air Act

*** 12. Funding Opportunity Number:**

EPA-OAR-OAQPS-22-01

* Title:

Enhanced Air Quality Monitoring for Communities

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

SRMT- Advancing Ambient Air Quality Monitoring in NY Tribal Nations

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: NY-021 * b. Program/Project: NY-021

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 11/01/2022 * b. End Date: 10/31/2025

18. Estimated Funding ($):

* a. Federal	381,729.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	381,729.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: Mr. * First Name: Ron

Middle Name:

* Last Name: LaFrance

Suffix:

* Title: Tribal Chief

* Telephone Number: 518.358.2272 Fax Number:

* Email: tribal.grants@srmt-nsn.gov

* Signature of Authorized Representative: Lawrence Swamp * Date Signed: 03/23/2022

BUDGET

Description	EPA Funding	Cost-Share
Personnel		
1. PI: Dr. S. Dhaniyala	$9,227	$25,867
2. Co-I: Dr. A. Ferro	$4,614	$24,860
3. Co-I: Dr. A. Rossner	$4,614	$23,095
4. Graduate Student	$41,633	
Total Personnel:	***$60,088***	***$73,822***
Fringe Benefits		
Full Fringe Benefits *(charged on Inv. Academic time)*		$21,187
Statutory Fringe Benefits (charged on Inv. Summer time)	$1,412	
Total Fringe Benefits	***$1,412***	***$21,187***
Domestic/Foreign Travel	***$3,000***	
Other Direct Costs		
1. Materials and Supplies	$7,679	
2. Contractual		
a. Consultant - Dr. Philip Hopke	$7,200	
3. Graduate Student Tuition	$28,050	
Total Other Direct Costs	***$42,930***	
Total Direct Costs	**$107,429**	**$95,009**
Indirect Costs (53% of MTDC)	**$42,071**	**$50,355**
Total Project Costs	**$149,500**	**$145,364**

BUDGET NARRATIVE

PERSONNEL

The Principal Investigator at Clarkson University, Dr. Suresh Dhaniyala, is requesting annual summer salary of 0.18 summer month per year. He will be responsible for Sensor Network. Dr. Dhaniyala will also devote 0.5 academic month per year toward the project which will be shown as cost sharing by Clarkson University.

The Clarkson University Co- Investigator, Dr. Andrea Ferro, is requesting 0.09 summer month per year toward the project. She will be responsible for data analysis and interpretation. Dr. Ferro will also devote 0.5 academic month per year toward the project which will be shown as cost sharing by Clarkson University.

The Clarkson Co-Investigator, Dr. Alan Rossner, is requesting 0.10 summer month per year toward the project and will be responsible for sensor network maintenance. Dr. Rossner will also devote 0.5 academic month per year toward the project which will be shown as cost sharing by Clarkson University.

The University has established that a one-month effort is equivalent to 173.33 hours. Work performed during the academic year but not compensated by the grant is deemed part of institutional duties. Annual salaries/wages are increased 2.5% annually for budget development purposes, consistent with historical rates of escalation. Actual salaries/wages in place during the time of expense are used. Clarkson's fiscal year (July 1–June 30) is used for compliance with the NSF's limitation on senior personnel salary requests.

Funding is also requested for one graduate student to work half-time during the first year and full-time in the second year of the project. The student will be involved in the research activities described in the project description. The University has established that full time graduate student stipends are based on 1,300 hours each year (40 hours per week during the summer and 20 hours per week during the academic year).

Role	**Annual Salary**	**Effort/Yr. *(mos. per year)***	**Total Amount**
PI: S. Dhaniyala	$151,384 *(anticipated with 2.5% esc.)*	0.18 summer and 0.5 academic	$35,094
Co-I: A. Ferro	$145,490 *(anticipated with 2.5% esc.)*	0.09 summer and 0.5 academic	$29,473
Co-I: A. Rossner	$135,155 *(anticipated with 2.5% esc.)*	0.10 summer and 0.5 academic	$27,707
Graduate Student: tbn	$27,300 *(initial with 2.5% esc.)*	6 mos. in year 1 and 12 mos. in year 2	$41,633

FRINGE BENEFITS

Fringe Benefits are calculated as direct costs in accordance with Clarkson University's Indirect Cost Rate Agreement with the Department of Health and Human Services. Faculty academic year or calendar year, regular full/part-time staff and postdoctoral researchers are charged a percentage of salaries or wages. The rate for FY 22 is 23.7%. The provisional rate beginning in FY 2023 is 28.7%. Faculty summer salaries and undergraduate summer student wages (if engaged) are charged FICA only (7.65%). Actual rates in place during the time of the expense are used.

TRAVEL

$1,000 is requested annually for travel for the PI, Co-Is, and/or student to the sampling site. An estimated annual breakdown of these trips is as follows:

Description	**Breakdown**	**Cost**
Travel Costs:	Car rental, gas	$1500
Per Diem:	~$40 per trip	$1500

SUPPLIES

A total of $7,678 is requested for the purchase of consumable supplies required for analyses including consumables, standards, and gases. An estimated breakdown is as follows:

Tubing, Swagelok fittings, etc:$678
Test particles, gas cylinders, etc: $1000
Computing resources such a VM, external drive, etc for data analysis: $1000
Instrument testing and servicing for use in validation experiments: $5000

OTHER:

- **Contractual:** If funded, Clarkson University will issue a consulting agreement for $2,400 per year to:
    - **Dr. Philip Hopke:** Dr Hopke will be assisting Clarkson faculty in sensor deployment, QA/QC, and data analysis. We have determined that Dr. Hopke should be named as the Consultant at this stage of the project due to the fact that he is a world-leading expert in the field with prior experience working with Saint Regis Mohawk Tribe.
- **Tuition:** A total of 12 credit hours tuition is budgeted per full year per student. The University establishes annual tuition rates. The rate for fiscal year 2023 is $1,533 per credit hour.

INDIRECT COSTS

Indirect Costs are calculated in accordance with Clarkson University's Indirect Cost Rate Agreement with the Department of Health and Human Services. Currently, Clarkson is using a rate of 53% of modified total direct costs (MTDC), per DHHS Agreement dated 06/22/21. If any rate other than the appropriate negotiated rate is applied to a project due to published program restrictions or sponsor policy, all unrecovered indirect costs are designated as cost sharing by Clarkson University. Clarkson's threshold for equipment is $5,000 as allowed by the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (UG 2 CFR § 200).

COST SHARING

Clarkson University will show as cost sharing the indirect costs normally charged on the first $25,000 of each subaward and the indirect costs normally charged on the service contracts. The total amount of cost sharing of at least $145,364 for the project or approximately 23% of the total project costs.

Quality Assurance Statement

The Environment Division of the St. Regis Mohawk Tribe is strongly committed to good science and EPA-approved quality assurance (QA) practices. This commitment complements the US EPA's own emphasis given to a comprehensive and coordinated QA program.

The Quality Assurance Management Plan (QAMP) describes the Environment Division's QA program. Its objectives are to clearly delineate the Environment Division's QA policy and management structure that will be used to implement the QA strategy and the QA monitoring requirements necessary to document the reliability and validity of environmental data.

The Environment Division is committed to sufficient QA activities being conducted within the Division to ensure that all environmental data generated and processed will be scientifically valid, of known precision and accuracy, of acceptable completeness, representativeness, and comparability and where appropriate, legally defensible.

Before the deployment of the monitoring network, we will develop a Quality Assurance Project Plan (QAPP) outlining our data quality objectives. The SRMT has extensive air monitoring experience and currently operates an air quality monitoring site (AQS site No. 36-033-7003) at which NOX, NO, NO2, O3, SO2, and PM2.5 are measured. Thus, there is significant experience in QA/QC in terms of routine calibration, flow checks, etc. in operating routine monitoring systems. Other collaborators do not currently have air quality monitoring activities and thus, we will develop training materials, check lists, and related documents and forms to provide a uniform approach to monitor operations and related upkeep, checks, and addressing any problems that might arise. It will not be possible to calibrate these monitoring systems in the field. Thus, we will have 2 spare monitoring systems that can be periodically calibrated and then rotated among the field sites for several days to a week at a time to provide the data needed to update the calibrations for the field sites and identify any sensor issues. In addition, the data are collected regularly through their internet connections and routine data assessment and validation approaches will be applied to provide early detection of problems that arise with any of the sensor units. The spare units can provide temporary replacements while defective systems are repaired, recalibrated, and then put back in service. Angela Benedict will serve as the QA manager of the project. Ms. Benedict has served as the quality assurance manager for the SRMT for over 15 years and has had many trainings through EPA and private companies such as Region 5 QA/QC training in 2019 and Sampling for Environmental Decisions through Envirostat. In addition, Dr. Philip Hopke will provide additional assistance. Dr. Hopke has previously served as the QA manager of the EPA Baltimore Supersite and the Clarkson activities in the Great Lakes Fish Monitoring and Surveillance Program. Thus, we believe will provide sufficient QA/QC support and oversight to ensure that the resulting data and information provided to the participating nations will be reliable and accurate.

Clarkson™
SPONSORED RESEARCH SERVICES

March 17, 2022

Ms. Angela Benedict,
Saint Regis Mohawk Tribe
Akwesasne, NY 13655

RE: Clarkson University Subcontract Proposal (Ref. No. 22215)

Proposal Title:	Advancing Ambient Air Quality Monitoring in NY Tribal Nations
Clarkson University PI:	Dr. Suresh Dhaniyala
Performance Period:	11/01/2022 – 10/31/2025
Total Requested Amount:	$149,500.00

On behalf of Dr. Suresh Dhaniyala and Clarkson University, we are pleased to attach accompanying this cover letter, our proposal for the above-referenced project, and participate under subcontract resulting from the same. Should an award be awarded to the University, our acceptance will be based on mutually-agreeable terms.

Clarkson University would provide assistance in the design of sensor networks, sensor network performance evaluation, data analysis and interpretation, technician training, sensor network management and maintenance, quality assurance/control issues, and possible health impact assessments. Our total requested amount for the project is $149,500 and we will provide a cost-share of $145,364 which is comprised of academic salary and associated fringe benefits and indirect costs for the Clarkson Investigators. We eagerly look forward to working with you on this exciting and high impact project to expand air quality monitoring and awareness to these underserved areas.

Should you have any questions or require further information that is administrative in nature, please contact me at the address provided below. Please address all technical inquiries to our Principal Investigator, who may be reached via email (sdhaniya@clarkson.edu) or by phone (315) 268-6574.

Sincerely,

Shannon M. Robinson, Ed.D.
Associate Vice Provost for Research & Technology Transfer

Manifest for Grant Application # GRANT13579066

Grant Application XML file (total 1):

1. GrantApplication.xml. (size 25153 bytes)

Forms Included in Zip File(total 6):

1. Form ProjectNarrativeAttachments_1_2-V1.2.pdf (size 16029 bytes)

2. Form SF424_3_0-V3.0.pdf (size 24124 bytes)

3. Form SF424A-V1.0.pdf (size 22841 bytes)

4. Form EPA4700_4_3_0-V3.0.pdf (size 22730 bytes)

5. Form OtherNarrativeAttachments_1_2-V1.2.pdf (size 16010 bytes)

6. Form EPA_KeyContacts_2_0-V2.0.pdf (size 37310 bytes)

Attachments Included in Zip File (total 6):

1. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1236-22215_SubcontractLetter_ClarksonUniversity_031722_smr.pdf application/pdf (size 170324 bytes)

2. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1235-2021 Saint Regis Mohawk Tribe Indirect Rate.pdf application/pdf (size 287122 bytes)

3. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1237-22215_BudgetNarrative_ClarksonUniversity.pdf application/pdf (size 143724 bytes)

4. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1238-Quality Assurance Statement.pdf application/pdf (size 51160 bytes)

5. ProjectNarrativeAttachments_1_2 ProjectNarrativeAttachments_1_2-Attachments-1234-Sensor Deployment SRMT 03 22 22 Final.pdf application/pdf (size 1277024 bytes)

6. OtherNarrativeAttachments_1_2 OtherNarrativeAttachments_1_2-Attachments-1239-RESUMES.pdf application/pdf (size 1273043 bytes)

Suresh Dhaniyala

Bayard D. Clarkson Distinguished Professor

Co-Director, Center for Air Resources Engineering and Science (CARES)

Department of Mechanical and Aeronautical Engineering

Clarkson University, Potsdam, NY 13699

Telephone: (315) 268-6574; Telefax: (315) 268-6695; E-Mail: sdhaniya@clarkson.edu

Education:

Indian Institute of Technology	Madras, India	B.Tech.	Naval Architecture	1992
University of Delaware	Newark, DE	M.M.E.	Mechanical Engineering	1994
University of Minnesota	Minneapolis, MN	Ph.D.	Mechanical Engineering	1998

Appointments:

Co-Director, Center for Air & Aquatic Resources Engg. and Sciences (CAARES)		July 2016 - present
Bayard D. Clarkson Distinguished Professor, Clarkson University		July 2015 – present
Professor	Mechanical and Aeronautical Engg, Clarkson University	May 2013 – present
Associate Professor	Mechanical and Aeronautical Engg, Clarkson University	Feb 2008 – May 2013
Assistant Professor	Mechanical and Aeronautical Engg, Clarkson University	Aug 2002 – Jan 2008
Post-Doctoral Scholar	Chemical Engineering, California Institute of Technology	Feb 1999 – Aug 2002

Prof. Dhaniyala is the Co-Director of Clarkson's Center for Air & Aquatic Resources Engg. and Sciences (CAARES). He teaches graduate and undergraduate courses in Aerosol Mechanics, Aerosol Instrumentation, Aerosol Dynamics, Climate Change, Fluid Mechanics, and Thermodynamics. Prof. Dhaniyala has graduated 10 PhD students and 20 M.S. students, and advised over 9 post-doctoral scholars and numerous undergraduate honors students.

Expertise

Dr. Dhaniyala's research is focused on improving our understanding of exposure to indoor and outdoor aerosol using novel sensors, data analytics, and computational aerosol transport modeling. The current research projects encompass development of new aerosol/gas sensors, modeling fate of aerosol in indoor spaces, characterization of bio-aerosol in built environment, evaluation of samplers for ambient and aircraft-based aerosol measurements. Our use of low-cost sensors include two on-going projects, including: 1) a collaboration with NY State Department of Environmental Conservation to use low-cost sensor network to assess the contribution of traffic aerosol to the total exposure burden of an EJ area in Albany and 2) use low-cost sensor networks in a classroom to understand the contribution of human emissions from talking and breathing to the total airborne aerosol burden in the indoor space.

Selected Publications:

1. Mondal S., Chaipitakporn C., Kumar V., Wangler B., Gurajala S., Dhaniyala S., and Sur S., COVID-19 in New York state: Effects of demographics and air quality on infection and fatality, accepted for publication in The Science of the Total Environment, 2021
2. Powers, S. E., DeWaters, J. E., & Dhaniyala, S. (2021). Climate Literacy—Imperative Competencies for Tomorrow's Engineers. *Sustainability*, *13*(17), 9684.
3. Priyamvada, H., Kumaragama, K., Chrzan, A., Athukorala, C., Sur, S., & Dhaniyala, S. (2020). Design and evaluation of a new electrostatic precipitation-based portable low-cost sampler for bioaerosol monitoring. *Aerosol Science and Technology*, 1-13.
4. *Dylan Leigh-Manuell*, Philip K. Hopke & Suresh Dhaniyala (2020) The Aitken counter: Revisiting its design and performance characteristics, Aerosol Science and Technology, DOI: 10.1080/02786826.2020.1763909

5. Nasr, Babak; Ahmadi, Goodarz; Ferro, Andrea R; and Dhaniyala, Suresh; (2020) A model for particle removal from surfaces with large-scale roughness in turbulent flows, Aerosol Science and Technology, 54:3, 291-303.
6. He, Meilu; Kuerbanjiang, Nueraili; Dhaniyala, Suresh; (2020) Performance characteristics of the low-cost Plantower PMS optical sensor, Aerosol Science and Technology.
7. Pudasaini, Batsal; Kanaparthi, Mark; Scrimgeour, Jan; Banerjee, Natasha; Mondal, Sumona; Skufca, Joseph; Dhaniyala, Suresh (2020) Estimating PM2. 5 from photographs, Atmospheric Environment: X, 100063,
8. Nasr, Babak; Ahmadi, Goodarz; Ferro, Andrea R; Dhaniyala, Suresh; (2019) Overview of mechanistic particle resuspension models: comparison with compilation of experimental data, Journal of Adhesion Science and Technology, 33:24, 2631-2660
9. Gurajala, Supraja; Dhaniyala, Suresh; Matthews, Jeanna N; (2019) Understanding public response to air quality using tweet analysis, Social Media+ Society, 5:3, 2.05631E+15.
10. Kanaparthi, M.A., Cevear, S.D., and Dhaniyala S., Towards near real-time SEMS size distribution measurements under up-scan operation, accepted for publication, Journal of Aerosol Science, August 2018.
11. Zhao, G., Chen, Y., Hopke, P. K., Holsen, T. M., & Dhaniyala, S. (2017). Characteristics of Traffic-Induced Fugitive Dust from Unpaved Roads. Aerosol Science and Technology, 2017.
12. Sajjadi, B. Tavakoli, G. Ahmadi, S. Dhaniyala, T. Harner, T. M. Holsen, Computational fluid dynamics (CFD) simulation of a newly designed passive particle sampler, Environmental Pollution, 214:410-418, July 2016.
13. He M., Dhaniyala S., and M. Wagner, Characterization of filter performance under low-pressure operation, Aerosol Science and Technology, 50.5:417-428, 2016.
14. DeMott, Paul J., et al. Sea spray aerosol as a unique source of ice nucleating particles. Proceedings of the National Academy of Sciences, Volume: 113, Issue: 21, Pages: 5797-5803, 2016.
15. Zhao G., Holsen, T, and Dhaniyala, S., Sampling Performance of a Large Particle Inlet (LPI) for Ground-based Studies: Wind-tunnel Experiments and Numerical Simulations, Journal of Aerosol Science, 10.1016/j.jaerosci.2015.08.006, September 2015.

Synergistic activities:

- Member, UN COSPAR committee responsible for establishing protocols for safe return of Mars Samples
- Chair, 3rd Technical Review Board, Mars 2020 Project Particle Resuspension and Transport, Jet Propulsion Lab, Pasadena CA
- Member of Mars 2020 Project Independent Review Board.
- Editorial Advisory Board, Aerosol Science and Technology, 2016-present
- Secretary (2012-2015) and Director (2007-2010) of American Association of Aerosol Research (AAAR).

Bio Sketch - Alan Rossner, PhD, CIH

Clarkson University, Institute for a Sustainable Environment
Environmental Health Science Program
P.O. Box 5715, Potsdam, NY 13699-55715
(315) 268-6470 E-mail: arossner@clarkson.edu

EDUCATION

Clarkson University, Potsdam, NY	Biology	Bachelor of Science
Univ. of Washington, Seattle, WA	Environmental Health	Master of Science
McGill University, Montreal CA	Occupational Health	Doctor of Philosophy

PROFESSIONAL EXPERIENCE

07/10 to Present	**Associate Director of the Institute for a Sustainable Environment and Full Professor**
07/03 to 02/09	**Assistant Professor** – Dept. of Biology (Environmental Health Program) Clarkson Univ., Potsdam, NY
08/95 to 06/03	**Instructor** - Environmental Health Program, Clarkson Univ., Potsdam, NY

Dr. Rossner is the Associate Director of Clarkson's *Institute for a Sustainable Environment* as well as the Director of Environmental Health Science and Environmental Science & Policy undergraduate programs. He teaches graduate and undergraduate courses in Risk Assessment, Environmental Health Science, and Industrial Hygiene. Dr. Rossner has advised numerous undergraduate and graduate students (> 30/ year). In addition, has advised masters and doctoral graduate students in the Environmental Science and Engineering program housed in the Institute for a Sustainable Environment (ISE). He has been on approximately 24 MS Defense and 10 PhD committees.

Expertise

Dr. Rossner has directed his research in areas that minimize human exposure to contaminants, improve working conditions, improve living conditions and minimize risk of disease. His recent work is on addressing the continuing challenge in environmental and occupational health of accurately estimating an individual's long-term exposure to the multitude of airborne contaminants found in our work and community environments. Research into improved exposure assessment strategies and air sampling methodologies that better characterize individuals' exposures are necessary to further our understanding of the health effects related to airborne contaminants. His research is often interdisciplinary, thus it is a collaborative effort with faculty at Clarkson University and outside institutions. Current research projects encompass three areas: 1) The development of air sampling methodologies, 2) Exposure assessment strategies for occupational and environmental air sampling, and 3) Indoor/outdoor air contaminant monitoring.

Specific community and workplace projects have included: Exposure assessment from wood pellet storage, Volatile organic compound exposures assessments in community and small businesses, Vapor intrusion sampling methodology assessment in large buildings, Prediction of mold contamination in homes and buildings using microbial volatile organic compound profiles, Low cost air quality sensor development and evaluation and Cumulative risk assessment.

SELECTED PUBLICATIONS

1. Niemeier, R. T., Williams, P. R., **Rossner, A.**, Clougherty, J. E., & Rice, G. E. (2020). A cumulative risk perspective for occupational health and safety (OHS) professionals. *International Journal of Environmental Research and Public Health*, *17*(17), 6342.

2. **Rossner, A.**, Williams, P. R., Mellas-Hulett, E., & Rahman, M. A. (2020). Analysis of historical worker exposures to respirable dust from talc mining and milling operations in Vermont. *Annals of work exposures and health*, *64*(4), 416-429.
3. Nocetti, D., Crimi, M., and **Rossner, A.**, Sampling strategies in the assessment of long-term exposures to toxic substances on air. Ground Water Remediation, September 2019.
4. Rahman, M., P.K. Hopke,, PK., **Rossner, A.,** Carbon Monoxide Off-Gassing from Bags of Wood Pellets., Annals of Work Exposures and Health, 62 (2) 248–252 (2018).
5. Lavine BK, Mirjankar N, LeBouf, R, **Rossner** A, Prediction of mold contamination from microbial volatile organic compound profiles using head space gas chromatography/mass spectrometry, Microchemical Journal, 103 (2012) 119-124
6. Nallathamby, P.D., Hopke, P.K., **Rossner, A.**, Dhaniyala, S., Marzocca, P., Petaja, T., Barthelmie, R.J., Pryor, S.C., Particle nucleation in a forested environment. Atmospheric Pollution Research 5, 805-810, (2014)
7. Li R., Kalenge, S., Lebouf, RF., **Rossner, A.,** Hopke, PK., Benedict, A., Source Apportionment of Benzene Downwind of a Major Point Source, *Atmospheric Pollution Research, 2 (2011) 138-143.*
8. Kalenge, S., Lebouf, RF., **Rossner, A** Hopke, PK., Benedict, A., Exposure assessment of outdoor BTEX concentrations to residents on the Saint Regis Mohawk Tribe reservation at Akwesasne New York State. Air Quality, Atmosphere & Health (**2013**), Volume 6, Issue 1, pp 181-193
9. Source Apportionment of BTEX in a Rural Northern New York State, Li R., Kalenge, S., Lebouf, RF., **Rossner, A.,** Hopke, PK., Benedict, A., *Atmospheric Pollution Research, 2 (2011) 138-143.*
10. LeBouf, RF., Schuckers, SA., and **Rossner, A** Preliminary assessment of a model to predict mold contamination based on microbial volatile organic compound profiles, *Science of the Total Environment*, Vol 408, Issue 17, August 2010, Pages 3648-3653.
11. **Rossner A.**, and Farant, J.P.: A Novel Personal Sampling Device for Collection of Volatile Organic Compounds: A Comparison to Charcoal Tubes and Diffusive Badges, *Journal Occup. And Environ. Hyg.* 1(2) 69-81 (2004).
12. **Rossner, A.**, Simon, P., Farant, J.P., and Wick, D.P.: Development of a flow controller for long-term sampling of gases and vapors using evacuated canisters. *Environ. Sci. Tech.* Vol. 36 (23) 2002.
13. LeBouf RF., Dru A. Burns, Anand Ranpara, Alan Rossner New NIOSH method for sampling volatile organic compounds using evacuated canisters: NMAM 3900. Synergist, *(Akron Ohio), September 2019*

Professional Activities:

Certified Industrial Hygienist, ABIH No. 4539
American Industrial Hygiene Association (AIHA) – Fellow
American Conference of Governmental Industrial Hygienist (ACGIH) – Past Board member
International Society of Indoor Air Quality and Climate (member)

NAME: Andrea R. Ferro

POSITION TITLE & INSTITUTION: Professor and Associate Director for Research, Clarkson University

A. PROFESSIONAL PREPARATION
(see PAPPG Chapter II.C.2.f.(i)(a))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Massachusetts	Amherst, MA	Applied Mathematics	BS	1989
Stanford University	Stanford, CA	Civil Engineering	MS	1992
Stanford University	Stanford, CA	Civil and Environmental Engineering	PhD	2002

B. APPOINTMENTS
(see PAPPG Chapter II.C.2.f.(i)(b))

From - To	Position Title, Organization and Location
2018-present	Associate Director for Research, Institute for a Sustainable Environment, CLARKSON UNIVERSITY, Potsdam, NY
2014-present	Professor, Department of Civil and Environmental Engineering, CLARKSON UNIVERSITY, Potsdam, NY
2009-2014	Associate Professor, Department of Civil and Environmental Engineering, CLARKSON UNIVERSITY, Potsdam, NY
2003-2009	Assistant Professor, Department of Civil and Environmental Engineering, CLARKSON UNIVERSITY, Potsdam, NY

C. PRODUCTS

(see PAPPG Chapter II.C.2.f.(i)(c))

Products Most Closely Related to the Proposed Project

[1] Zíková, N., M. Masiol, D.C. Chalupa, D.Q. Rich, A.R. Ferro, P.K. Hopke. 2017. Estimating hourly concentrations of PM2.5 across a metropolitan area using low-cost particle monitors.
[2] Masiol, Mauro, Naděžda Zíková, David C. Chalupa, David Q. Rich, Andrea R. Ferro, Philip K. Hopke. 2018. Hourly land-use regression models based on low-cost PM monitor data. Environmental Research, Vol. 167, pp. 7-14. https://doi.org/10.1016/j.envres.2018.06.052
[3] Williamson, Kristin, Sourav Das, Andrea R. Ferro and Shankar Chellam. 2021. Elemental Composition of Indoor and Outdoor Coarse Particulate Matter at an Inner-City High School. Atmospheric Environment, Vol. 261, 118559
[4] Ferro, Andrea R. and Hopke, Philip K. 2021. Chapter VIII.1 Fundamentals of Exposure Science, in Zhang, Hopke and Mandin, eds.-in-chief, Handbook of Indoor Air Quality: Chemical Pollutants, Springer Publishing Company, New York, NY, invited; submitted.
[5] Nasr, Babak, Ahmadi, Goodarz, Andrea R. Ferro, S. Dhaniyala. 2020. A model for particle removal from surfaces with large-scale roughness in turbulent flows. Aerosol Science & Technology, Vol. 54, pp. 291-303. https://doi.org/10.1080/02786826.2019.1692126

Other Significant Products, Whether or Not Related to the Proposed Project

1] Ahmed, Tanvir, ..., Andrea R. Ferro, et al. 2021. "Variability in expiratory trajectory angles during consonant production by one human subject and from a physical mouth model: Application to respiratory droplet emission." Indoor Air, Vol. 31, pp. 1896-1912.
[2] Palmisani, Jolanda, ..., Andrea Ferro. 2021. "Indoor air quality evaluation in oncology units at two European hospitals: low-cost sensors for TVOCs, PM2.5 and CO2 real-time monitoring. Bldg. & Environ. Vol. 205, 108237.
[3] Haines SR,..., Ferro AR, et al. 2019. "Ten questions concerning the implications of carpet on indoor chemistry and microbiology." Bldg. & Environ. Vol. 170, 106589.
[4] Ferro, Andrea R., Hopke, Philip K.. 2022. "Fundamentals of Exposure Science," in Zhang, Hopke and Mandin, Handbook of Indoor Air Quality: Chemical Pollutants, Springer Publishing Company, New York, NY, accepted.

D. SYNERGISTIC ACTIVITIES

(see PAPPG Chapter II.C.2.f.(i)(d))

[1] Associate Director for Research for Institute for a Sustainable Environment at Clarkson University; facilitate multidisciplinary team research and faculty development.
[2] Conducted projects representing >25 external grants and contracts totaling ~$5M, including NSF CAREER Award (2009-2014) and NSF Research Experience for Undergraduates (REU) Site Program Award (2008-2011) with multiple Research Experience for Teachers (RET) supplements. Currently PI for NSF ADVANCE proposal.
[3] Advised 25 graduate and >30 undergraduate researchers at Clarkson University, >50% of which are female and 20% of which are underrepresented minorities.
[4] Recent past president of the American Association for Aerosol Research (AAAR).
[5] Fellow of the International Society of Indoor Air Quality and Climate (ISIAQ).

Curriculum Vita

Philip K. Hopke

Experience:

Philip K. Hopke received B.S. in Chemistry from Trinity College, Hartford, CT in 1965 and his Ph.D. degree from Princeton University in 1969. He was a research associate at M.I.T. until August 1970. After 4 years as an assistant professor of chemistry at the State University College at Fredonia, NY, he joined the University of Illinois as a visiting assistant professor of chemistry. Beginning in 1975, Dr. Hopke joined the Institute for Environmental Studies where in 1978, he was promoted to Associate Professor. In 1982, he became Professor of Environmental Chemistry with joint appointments in the Departments of Civil Engineering and Nuclear Engineering. On July 1, 1989, he joined Clarkson University as the first Robert A. Plane Professor. From July 1997 to June 1999, he served as Dean of the Graduate School and from July 1999 to June 2000, he was Chair of the Department of Chemistry and Head of the Division of Physical and Chemical Sciences. In July 2000 his principal appointment moved to the Department of Chemical Engineering while retaining appointment in Chemistry and Civil and Environmental Engineering. As of January 1, 2002, he becomes the Bayard D. Clarkson Distinguished Professor and Director of the Center for Air Resources Engineering and Science. On July 1, 2010, he became the founding director of the Institute for a Sustainable Environment. He stepped down from these positions in 2015. On May 7, 2016, he was designated as the Bayard D. Clarkson Distinguished Professor Emeritus. In April 2016, he was appointed as an Adjunct Professor in the Department of Public Health Sciences at the University of Rochester.

Research Interests:

Chemical characterization of ambient aerosol samples; Characterization of source/receptor relationships for ambient air pollutants; Multivariate statistical methods for data analysis; Indoor air quality; Exposure and risk assessment; Emissions and properties of solid biomass combustion systems; Experimental studies of homogeneous, heterogeneous, and ion-induced nucleation.

Honors and Awards:

2020 Fellow, Air and Waste Management Association
2018 Fissan-Pui-TSI Award for International Collaboration, International Aerosol Research Assembly
2016 Constance L. Mehlman Award, International Society for Exposure Science
2015 Arthur C. Stern Distinguished Paper Award, Air and Waste Management Association
2014 Lifetime Achievement Award from the Chemometrics in Analytical Chemistry Conference
2008-09 Jefferson Science Fellow, US. Department of State
2008 Fellow, American Association for Aerosol Research
2007 Eastern Analytical Symposium Award for Excellence in Chemometrics
2007 Fellow, American Association for the Advancement of Science
2006 Fellow, International Aerosol Research Assembly
2006 Election to the International Statistics Institute
2004 David Sinclair Award of the American Association for Aerosol Research

Professional Activities:

Air Quality Fellow, Embassy Dhaka; Embassy Baghdad; Embassy Yerevan; Embassy Ankara
Chair, Clean Air Scientific Advisory Committee, U.S. Environmental Protection Agency, 2000 - 2004.
Member, Clean Air Scientific Advisory Committee, U.S. Environmental Protection Agency, 1995 - 2000.
Member of 13 NRC Committees related to air pollution, health and risk assessment
President, American Association for Aerosol Research, October 2003 to October 2004
Co-Editor-in-Chief, Science of the Total Environment, 2020-

Selected Recent Publications (Selected from 823)

Source Apportionment of Benzene Downwind of a Major Point Source, R. Li, S. Kalenge, P.K. Hopke, R. Lebouf, A. Rossner, A. Benedict, Atmospheric Pollution Research 2: 138-143 (2011).

Assessment of exposure to outdoor BTEX concentrations on the Saint Regis Mohawk Tribe reservation at Akwesasne New York State, S. Kalenge, R. Labouf, P.K. Hopke, A. Rossner, A. Benedict-Dunn, Air Quality, Atmosphere, and Health 6: 181–193 (2013).

Long-term trends (2005-2016) of source apportioned $PM_{2.5}$ across New York State, M. Masiol, S. Squizzato, D.Q. Rich, P. K. Hopke, Atmos. Environ. 201: 110–120 (2019).

Long-term changes of source apportioned particle number concentrations in a metropolitan area of the northeastern United States, M. Masiol, S. Squizzato, F. Emami, D.C. Chalupa, M.J. Utell, D.Q. Rich, P.K. Hopke, Atmosphere 10, 27 (2019).

Differential probability functions for investigating long-term changes in local and regional air pollution sources, M. Masiol, S. Squizzato, M.-D. Cheng, D. Q. Rich, P. K. Hopke, Aerosol Air Qual. Res. 19: 724–736 (2019).

Global Review of Recent Source Apportionments for Airborne Particulate Matter, P.K. Hopke, Q. Dai, L. Li, Y. Feng, Sci. Total Environ. 740:140091 (2020).

Temporal changes in short-term associations between cardiorespiratory emergency department visits and PM2.5 in Los Angeles, 2005 to 2016, J. Bi, R.R. D'Souza, D.Q. Rich, P.K. Hopke, A.G. Russell, Y. Liu, H. Chang, S. Ebelt, Environ. Res. 190: 109967 (2020).

$PM_{2.5}$ in Abuja, Nigeria: Chemical characterization, source apportionment, temporal variations, transport pathways, and the health risks assessment, I. D. Sulaymon, X. Mei, S. Yang, S. Chen, Y. Zhang, P. K. Hopke, J.J. Schauer, Y. Zhang, Atmos. Res 237: 104833 (2020).

Long-term trends in PM2.5 mass and particle number concentrations in urban air: the impacts of mitigation measures and changing climates, A.L. de Jesus, H. Thompson, L.D. Knibbs, M. Kowalski, J. Cyrys, J.V. Niemi, H. Timonen, K. Luoma, T. Petäjä, D. Beddows, R.M. Harrison, P.K. Hopke, L. Morawska, Environ. Pollut. 263: 114500 (2020).

Improved Risk Communications with a Bayesian Multipollutant Air Quality Health Index H. Xu, W. Zeng, B. Guo, P.K. Hopke, X. Qiao, H. Choi, B. Luo, W. Zhang, X. Zhao, Science of the Total Environment 722: 137892 (2020).

Recent Advances in Air Pollution Mixture Resolutions, P.K. Hopke, Microchem. J. 163: 105907 (2021).

Health and Charge Benefits from Decreasing PM2.5 Concentrations in New York State: Effects of Changing Compositions, P.K. Hopke, E.L. Hill, Atmospheric Pollution Research 12: 47–53 (2021).

Multiple air quality monitoring evidence of the impacts of large-scale social restrictions during the COVID-19 pandemic in Jakarta, Indonesia. M. Santoso, P.K Hopke, D.A. Permadi, E. Damastuti, D.D. Lestiani, S. Kurniawati, D. Khoerotunnisya, S. K. Sukir, Aerosol Air Qual. Res. 21: 200645 (2021).

Haze episodes before and during the COVID-19 shutdown in Tianjin, China: contribution of fireworks and residential heating, Q. Dai, J. Ding, L. Hou, L. Li, Z. Cai, B. Liu, C. Song, X. Bi, J. Wu, Y. Zhang, Y. Feng, P.K. Hopke, Environ. Pollut. 286: 117252 (2021).

Evaluation of regional transport of $PM_{2.5}$ during severe atmospheric pollution episodes in the Western Yangtze River Delta, China, I.D. Sulaymon, Y. Zhang, P.K. Hopke, Y. Zhang, F.O. Ajibade, J. Hua, J. Environ. Manage. 293: 112827 (2021).

Assessing Volatile Organic Compound Sources in a Boreal Forest Using Positive Matrix Factorization (PMF), M. Vestenius, P.K. Hopke, K. Lehtipalo, T. Petäjä, H. Hakola, H. Hellén, Atmos. Environ. 259: 118503 (2021).

Spring Festival and COVID-19 lockdown: disentangling PM sources in major Chinese cities, Q. Dai, L. Hou, L. B. Liu, Y. Zhang, C. Song, Z. Shi, P.K. Hopke, Y. Feng, Geophys. Res. Letters 48, e2021GL093403 (2021).

Evaluation of regional transport of $PM_{2.5}$ during severe atmospheric pollution episodes in the Western Yangtze River Delta, China, I.D. Sulaymon, Y. Zhang, P.K. Hopke, Y. Zhang, F.O. Ajibade, J. Hua, J. Environ. Manage. 293: 112827 (2021).

Air quality in Canadian port cities after regulation of low-sulphur marine fuel in the North American Emissions Control Area, A.T. Anastasopolos, U.M. Sofowote, P.K. Hopke, M. Rouleau, T. Shin, A. Dheri, H. Peng, R. Kulka, M.D. Gibson, P.-M. Farah, N. Sundar, Sci. Total Environ. 791: 147949 (2021).

Estimating uncertainties of source contributions to PM2.5 using moving window evolving dispersion normalized PMF, L. Song, Q. Dai, Y. Feng, P.K. Hopke, Environ. Pollut. 286: 117576 (2021).

Spatial-Temporal Variation and Local Source Identification of Air Pollutants in a Semi-Urban Settlement in Nigeria using Low-Cost Sensors, O.K. Owoade, P.O. Abiodun, O.R. Omokungbe, O. G. Fawole, F.S. Olise, O.O.M. Popoola, R.L. Jones, P.K. Hopke, Aerosol Air Qual. Res. 21: 200598 (2021).

Multiply improved positive matrix factorization for source apportionment of volatile organic compounds during the COVID-19 shutdown in Tianjin, China, Y. Gu, B. Liu, Q. Dai, Y. Zhang, M. Zhou, Y. Feng, P.K. Hopke, Environ. Int. 158: 106979 (2022).

Long-Term PM2.5 Source Analyses in New York City from the Perspective of Dispersion Normalized PMF, Y. Chen, D.Q. Rich, P.K. Hopke, Atmos. Environ.272: 118949 (2022).

Source Apportionment of Particle Number Concentrations: A Global Review, P.K. Hopke, Y. Feng, Qili Dai, Sci. Total Environ. 819: 153104 (2022).

Changing Emissions Results in Changed $PM_{2.5}$ Composition and Health Impacts, P.K. Hopke, G. Hidy, Atmosphere 13, 193 (2022).

Improved positive matrix factorization for source apportionment of volatile organic compounds in vehicular emissions during the Spring Festival in Tianjin, China, T. Yang, B. Liu, Y. Yang, Q. Dai, Y. Zhang, Y. Feng, P. K. Hopke, Environ. Pollut. (in press, 2022).

Professor Hopke has authored or coauthored over 823 papers in scientific journals, more than 80 chapters in books and peer reviewed proceedings, written 1 and edited 5 books, directed 57 Master of Science and 37 Doctor of Philosophy theses, and written numerous technical reports.

ANGELA BENEDICT

Saint Regis Mohawk Tribe
Air Quality Program Manager

71 Margaret Terrance Memorial Way
Akwesasne, NY 13655

(518) 358-5937 Cell (315) 250-1028
angela.benedict@srmt-nsn.gov

Skills

- Leadership and supervisory experience
- Project Management and reporting
- Proficient in Microsoft Word, PowerPoint, Outlook, Excel, and Access
- Quality Assurance Work Plan Development
- Seek funding sources and write grant proposals
- Implement the Tribal Implementation plan and the climate change adaptation plan
- Data management including quality assurance and quality control as well as submitting data into the air quality subsystem
- CPR and First Aid Certified

Education

- New York State Department of Health (1996)
  - Environmental Health Technician Certification
- Long Island University-South Hampton, NY (1993-1994)
  - Studied Marine Chemistry
- North Country Community College – Saranac Lake, NY (1991-1993)
  - Associates Applied Science Degree

Training

- Active Shooter-FEMA IS-907-SRMT 2019 Adrian McDonald
- SRMT Safety Policy-2016-Adriane McDonald
- National Incident Management Systems Incident Command Systems 100b, 200b, 700a, 800b, G-300 and 400 and 552 COOP certified
- Sampling for Defensible Environmental Decisions
- CITEC
  - Basic Supervisor Certification
  - Intermediate Supervisor Certification
- Crucial Conversations
- Crucial Accountability
- Twelve-week environmental health technician certification program with New York State
- Time Management for Tribal Professionals-Falmouth Institute

Professional Experience

Saint Regis Mohawk Tribe 1995 to present

- Air Quality Program Manager 2001-Present
- Tribal Quality Assurance Officer 2008-Present

- Air Quality Technician 1999-2001
- Solid Waste Technician 1998-1999
- Water Quality Technician 1995-2000
- Environmental Health Technician 1995-1999

Leadership Activities

- Executive Committee Chair/member of the National Tribal Air Association (NTAA)
- Chair of the NTAA Indoor Air Quality Workgroup
- Completed numerous air quality investigations that have resulted in homes and buildings being remediated, basements being reconstructed and septic systems being brought up to code.
- Received and managed over $5M in state, federal and private grants

Awards & Achievements

- Co-authored article in conjunction with Clarkson University
    - *Kalenge, Shelia & Lebouf, Ryan & Hopke, Philip & Rossner, Alan & Benedict-Dunn, Angela. (2013). Assessment of exposure to outdoor BTEX concentrations on the Saint Regis Mohawk Tribe reservation at Akwesasne New York State. Air Quality Atmosphere & Health. 6. 181-195. 10.1007/s11869-011-0159-y.*
- 2016 Virgil Masayesva Excellence Award

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

Indian Organization
Indirect Cost Negotiation Agreement

EIN: 16-1007650

Date: 02/10/2021

Organization:

Saint Regis Mohawk Tribe
412 State Route 37
Akwesasne, NY 13655

Report Number: 2020-0538

Filing Ref.:
Last Negotiation Agreement
dated: 10/21/2019

The indirect cost rate contained herein is for use on grants, contracts, and other agreements with the Federal Government to which Public Law 93-638 and 2 CFR Part 200 apply subject to the limitations contained in 25 CFR 900 and Section II.A. of this agreement. The rate was negotiated by the U.S. Department of the Interior, Interior Business Center, and the subject organization in accordance with the authority contained in applicable regulations.

Section I: Rate

Start Date	End Date	Rate Type	Name	Rate	Base	Location	Applicable To
01/01/2021	12/31/2021	Fixed Carryforward	Indirect	30.69 %	(A)	All	ISDA (638)
			Indirect	20.59 %	(A)	All	All Others

(A) Base: Total direct costs, less capital expenditures and passthrough funds. Passthrough funds are normally defined as payments to participants, stipends to eligible recipients, or subawards, all of which normally require minimal administrative effort.

Treatment of fringe benefits: Fringe benefits applicable to direct salaries and wages are treated as direct costs; fringe benefits applicable to indirect salaries and wages are treated as indirect costs.

Section II: General

A. **Limitations:** Use of the rate(s) contained in this agreement is subject to any applicable statutory limitations. Acceptance of the rate(s) agreed to herein is predicated upon these conditions: (1) no costs other than those incurred by the subject organization were included in its indirect cost rate proposal, (2) all such costs are the legal obligations of the grantee/contractor, (3) similar types of costs have been accorded consistent treatment, and (4) the same costs that have been treated as indirect costs have not been claimed as direct costs (for example, supplies can be charged directly to a program or activity as long as these costs are not part of the supply costs included in the indirect cost pool for central administration).

B. **Audit:** All costs (direct and indirect, federal and non-federal) are subject to audit. Adjustments to amounts resulting from audit of the cost allocation plan or indirect cost rate proposal upon which the negotiation of this agreement was based will be compensated for in a subsequent negotiation.

C. **Changes:** The rate(s) contained in this agreement are based on the accounting system in effect at the time the proposal was submitted. Changes in the method of accounting for costs which affect the amount of reimbursement resulting from use of the rate(s) in this agreement may require the prior approval of the cognizant agency. Failure to obtain such approval may result in subsequent audit disallowance.

D. **Rate Type:**

1. Fixed Carryforward Rate: The fixed carryforward rate is based on an estimate of the costs that will be incurred during the period for which the rate applies. When the actual costs for such period have been determined, an adjustment will be made to the rate for a future period, if necessary, to compensate for the difference between the costs used to establish the fixed rate and the actual costs.

2. Provisional/Final Rate: Within six (6) months after year end, a final indirect cost rate proposal must be submitted based on actual costs. Billings and charges to contracts and grants must be adjusted if the final rate varies from the provisional rate. If the final rate is greater than the provisional rate and there are no funds available to cover the additional indirect costs, the organization may not recover all indirect costs. Conversely, if the final rate is less than the provisional rate, the organization will be required to pay back the difference to the funding agency.

3. Predetermined Rate: A predetermined rate is an indirect cost rate applicable to a specified current or future period, usually the organization's fiscal year. The rate is based on an estimate of the costs to be incurred during the period. A predetermined rate is not subject to adjustment.

E. **Rate Extension:** Only final and predetermined rates may be eligible for consideration of rate extensions. Requests for rate extensions of a current rate will be reviewed on a case-by-case basis. If an extension is granted, the non-Federal entity may not request a rate review until the extension period ends. In the last year of a rate extension period, the non-Federal entity must submit a new rate proposal for the next fiscal period.

F. **Agency Notification:** Copies of this document may be provided to other federal offices as a means of notifying them of the agreement contained herein.

G. **Record Keeping:** Organizations must maintain accounting records that demonstrate that each type of cost has been treated consistently either as a direct cost or an indirect cost. Records pertaining to the costs of program administration, such as salaries, travel, and related costs, should be kept on an annual basis.

H. **Reimbursement Ceilings:** Grantee/contractor program agreements providing for ceilings on indirect cost rates or reimbursement amounts are subject to the ceilings stipulated in the contract or grant agreements. If the ceiling rate is higher than the negotiated rate in Section I of this agreement, the negotiated rate will be used to determine the maximum allowable indirect cost.

I. **Use of Other Rates:** If any federal programs are reimbursing indirect costs to this grantee/contractor by a measure other than the approved rate(s) in this agreement, the grantee/contractor should credit such costs to the

affected programs, and the approved rate(s) should be used to identify the maximum amount of indirect cost allocable to these programs.

J. **Other:**

1. The purpose of an indirect cost rate is to facilitate the allocation and billing of indirect costs. Approval of the indirect cost rate does not mean that an organization can recover more than the actual costs of a particular program or activity.

2. Programs received or initiated by the organization subsequent to the negotiation of this agreement are subject to the approved indirect cost rate(s) if the programs receive administrative support from the indirect cost pool. It should be noted that this could result in an adjustment to a future rate.

3. Each Indian tribal government desiring reimbursement of indirect costs must submit its indirect cost proposal to our office within six (6) months after the close of the Tribe's fiscal year, unless an exception is approved.

Section III: Acceptance

Listed below are the signatures of acceptance for this agreement:

By the Indian Organization	By the Cognizant Federal Government Agency
Saint Regis Mohawk Tribe	US Department of the Interior - BIA
DocuSigned by: Tsiorasa Barreiro 132B308119A9465...	DocuSigned by: Craig Wills B47DB1F4A5DB4BF...
Signature	Signature
Tsiorasa Barreiro Name:	Craig Wills Name:
Executive Director Title:	Division Chief Indirect Cost Services Division Interior Business Center Title:
2/11/2021 Date	2/10/2021 Date

Negotiated by: Marilyn Elgar
Telephone: (916) 930-3811

Next Proposal Due Date: 06/30/2021

Project Title: Advancing Ambient Air Quality Monitoring in NY Tribal Nations
Tribal Government USEPA Region 2
EPA-OAR-OAQPS-22-01
CDFA No: 66.034

Applicant Information:
Applicant Organization: Saint Regis Mohawk Tribe, Environment Division
Address: 71 Margaret Terrance Memorial Way, Akwesasne, New York 13655
Primary contact name: Anthony David, Environmental Director; 518-358-5937 X 5068;
tony.david@srmt-nsn.gov
Secondary Contact: Angela Benedict-Dunn, Air Quality Program Manager; 518-358-5937 X 5052;
angela.benedict@srmt-nsn.gov

DUNS number: 79-781-6647;

Set-Aside: Tribal set-aside;

Brief Description of Applicant Organization:
The Saint Regis Mohawk Tribe is an accountable government and professional or9anization that benefits the community by: Building the path through which community development can be fully realized now and in the future; Exercising tribal sovereignty and all the tools of government; Developing capacity as a service delivery organization; and Engaging in collaborative partnerships that expand its impact.

Project Partner(s) (if applicable):

Partner Organization: Clarkson University

Partner Primary Contact Name: Shannon M. Robinson, Associate Vice Provost for Research & Technology Transfer, 315-268-7766; srobinso@clarkson.edu

Project Location: Akwesasne Mohawk Community, NY 13655

Air Pollutant Scope: PM2.5, CO, O3, NO2, and VOCs

Budget Summary:

EPA Funding Requested	Total Project Cost
$381,729	$381,729

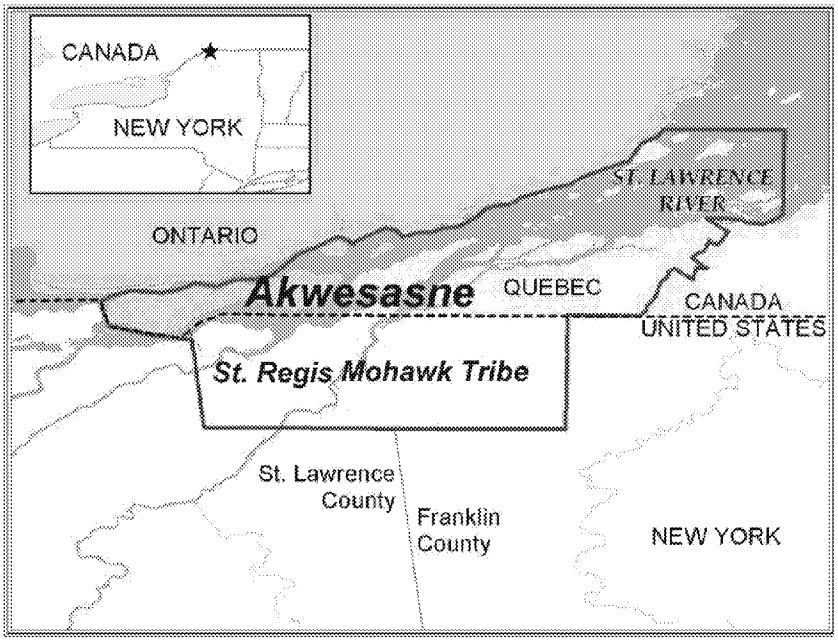
Project Period: Nov 2022 to Oct 2025

Short Project Description: This project will deploy a mesh-networked, low-cost air quality monitoring network in Akwesanse. There are several sources of air pollution that are of concern to the community, but their impact on the community is unclear because of lack of monitoring stations in and near the Nations. This project will address that gap. We will work closely with the community to identify sampling locations and use a real-time data dashboard and in-person/virtual townhall sessions to disseminate the monitoring results to the community.

Section 1: Project Summary and Approach:

A. Overall Project:

The proposal will establish a low-cost air quality monitoring network in Akwesasne and build capacity and knowledge in the community to identify local pollution sources and measures needed to tackle the identified problems. This project will bring together air quality and low-cost sensor experts with local environmental officers to ensure that community engagement and action is at the center of the proposal activities.



Sampling Sites:

The proposed monitoring study will be based in Northern NY. Figure 2 shows the location of the Saint Regis Mohawk Tribe in NY. The proposed sampling sites will all be located in Akwesasne.

Territory Locations:

Akwesasne (Saint Regis Mohawk Tribe) is located on the banks of the St. Lawrence River, at its confluence with the Raquette and St. Regis Rivers, and traverses the U.S.-Canadian border. Roughly 75 miles northeast of Lake Ontario and 60 miles southwest of Montreal, Akwesasne sits within the St. Lawrence Valley and contains approximately 29,000 acres of undisputed land in both the United States and Canada.

In the past, the SRMT Air Quality Program conducted a study on benzene exposure in Akwesasne. The results of this study showed that higher traffic and the refueling of cars led to higher exposures of benzene to the community. Akwesasne is known as a place to get gasoline at cheaper prices. Along with at least six large gas stations, the Akwesasne Mohawk Casino Resort is right in the middle of the main seven-mile major state highway route 37 going directly through the Akwesasne Territory.

These sites are selected because there is significant concern in the communities about the impact of local industries and traffic on air quality and community health. A significant source is likely to be the high traffic on the nearby highways and state roads. Additionally, because of the presence of gas stations with lower gas prices than the rest of the state and casinos, there is significant local traffic

The air pollution issues based on EJScreen, possible pollution sources and associated pollutants are listed in Table 1. For all three nations, the issues are similar – the PM2.5, Ozone, Air toxics cancer risk and Air toxics respiratory health index are typically around the 80th percentile (compared to US). There are several suspected sources of these pollutants (listed in Table 1).

Table 1: Location of monitoring sites, sources of concern, the pollutants that are most relevant for Akwesasne.

Location	EJ Issue (from EJScreen); Percentiles relative to US	Possible sources	Relevant pollutants
Saint Regis Mohawk Tribe	80th percentile for PM2.5, Ozone, Air Toxics Cancer Risk and Air Toxics Respiratory Health Index	Gas Stations, local traffic, emissions from nearby sources;	CO, O3, NOx, $PM_{2.5}$, VOCs

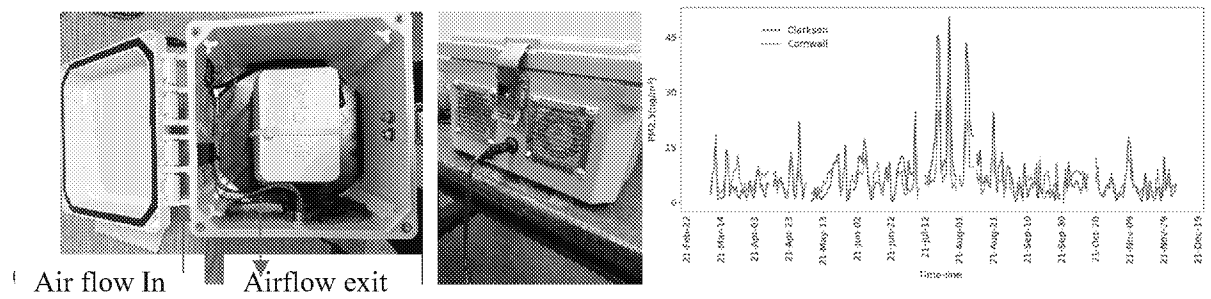
Saint Regis Mohawk Tribe (SRMT) in Northern NY, in collaboration with Clarkson University, has previously studied indoor-outdoor air quality issues in the nation. While the past studies have focused only on short-term intensives to understand exposure to pollutants from specific sources, they setup a strong base for the proposed community-wide continuous monitoring plan being proposed here. Also, the strong partnership between SRMT and Clarkson established during the past collaborations will help drive success of the current effort to build a local air quality monitoring network focused on addressing community issues and building local capacity.

To monitor the pollutants of concern, we propose to use low-cost sensors from TelosAir Corp (Potsdam, NY) which have been extensively used by Clarkson University, our partners in the current proposal. These sensors, called the Duet-AQ sensors, are integrated units that provide real-time measurements of $PM_{2.5}$, CO, O_3/NO_2, CO_2, and VOCs, along with air property measurements of temperature, RH, and barometric pressure. The specifics of the air quality sensors in the Duet are listed in Table 2.

Table 2: Details of sensing elements in TelosAir's Duet-AQ sensors.

Measurement	Technique	Range	Detection limit
PM2.5	light scattering	< 1 to 1000 $\mu g/m^3$	1 $\mu g/m^3$
CO	Metal Oxide	< 500 ppm	40 ppb
O3, NO2	Electrochemical	< 20 ppm	30ppb
CO2	Photoacoustic	< 2000 ppm	400ppm
VOC	Metal Oxides	Variable (depending on specific VOC)	0.05ppm (Ethanol)

The Duet-AQ sensors (Figure 3) are housed in a weather-proof enclosure and have been tested extensive at Clarkson to ensure that they can operate down to the cold temperatures likely in these regions. The sensors operate with 110V external power and transmit data via a radio (LoRa) to a central gateway. The sensors form a mesh-network that allows the units to be located over a vast region and still send data wirelessly to the central gateway unit. The gateway unit is the only unit that will need to be connected to WiFi/Ethernet/Cellular service to transmit the data to the cloud in real-time.



(a) (b) (c)

Figure 3: (a) Integrated Duet-AQ sensor for outdoor air quality measurements; (b) Bottom view of the Duet-AQ unit; (c) Sample data from deployment of the unit in Clarkson in comparison with Environment Canada from 30 miles away from the deployment site in Clarkson.

Using a LoRa connectivity protocol allows sensors to transmit data over a range of ~ 1km to other sensors or to the central gateway. Each gateway can handle data up to 20 sensors – thus one gateway is likely to be sufficient for each of the monitoring sites.

Data logistics:

The data from the sensors will be pushed to the TelosAir cloud and be available in real-time through an API. The real-time trends and geo-visualization of the data will be available through the TelosAir dashboard. In addition, Clarkson University in collaboration with TelosAir will develop advanced analytics to visualize the data. Access to data will be governed by SRMT data policies

Proposed work:

Sensor Installation:

In Akwesasne, we will deploy 30 sensor units throughout the territory, with a focus on capturing the contribution of different sources to the residents. The sensor units will be located along the high-traffic roads, in the vicinity of gas stations, near homes, and around the boundary of the nations to capture out-of-Nation contribution. Weather information is available for each of the sites from met stations within 30 miles of the monitoring locations. Additionally, each of the sensor units will also be fitted with wind-vanes for local wind velocity and wind direction measurements. The sensors will be located on light poles or other platforms that can provide power and easy access for servicing.

Sensor Data Quality Check:

The data from the sensors will be pushed online (via WiFi, if available, or cellular data) for real-time data visualization and access for off-line analysis. A number of different approaches will be used to check the quality of data obtained from the sensors. Prior to the field deployment, Clarkson University researchers along with the lead technician responsible for field deployment of the units will do a co-location study at Clarkson. The study will be conducted over a week-long period and the primary goal of this deployment will be to access the precision of the units and determine any scaling factors necessary. Additionally, data transmission and robustness of access will be established during this deployment.

In the second deployment all units will be co-located at the SRMT AQS site. This co-location study has two objectives: to evaluate the precision of the units in the field; and to estimate the accuracy of measurements by comparison with the regulatory-quality monitoring sites in SRMT and Cornwall, Canada (< 20 miles from SRMT) and with an intensive measurement campaign. The regulatory-quality measurements include hourly data of $PM_{2.5}$, O_3, and NO_2 (http://www.airqualityontario.com/history/station.php?stationid=56051). Regression analysis and non-parametric distributional analyses of the sensor data with the Cornwall data will provide a measure of accuracy of sensor measurements and an ability to correct the data.

During this field intensive, the accuracy of VOC measurements will also be evaluated. For this study, a canister-based sampling campaign will be conducted. Samples will be collected on a daily basis for a week and analyzed in the lab (Clarkson University) to compare real-time VOC measurements in the Duet-AQ against lab-based determination of total VOCs (and speciation).

Data Analysis:
The sensor data (after quality check) will be available on the dashboard and compared with NAAQS to provide the community a real-time understanding of the pollutant concentration that they are exposed to. In addition to the real-time data, Clarkson University in collaboration with TelosAir Corp, will provide the community with access to advanced analytics to understand sources of pollution and provide guidance for mitigation measures. Some of the proposed analysis include:

1) Source determination: 9-10 sensor distribution around the Tribal territory with an emphasis on populated areas. Using wind-velocity data with the spatio-temporal concentration profiles, we will estimate the sources that are likely contributing to air quality problems.
2) Pollution trends: The measurements will be analyzed to determine trends in pollutants as a function of time of day, day of week, seasons, and over the 3 years of the project. The trend report will provide a direct visual self-guidance for the community about the likely sources contributing to local air quality issues.
3) Benchmarking: To further aid the community understand the relative quality of their air, we will provide benchmark metrics that places the quality of their air relative to the other Tribal Nations, the state, and the country. This benchmarking will increase community awareness about air quality metrics and drive community-based initiatives to influence local and state policies.

B. Project Significance:

The proposed project will provide unprecedented quantitative information about airborne pollutants to the Akwesasne Tribal community that has had limited sites in their territory or in their vicinity. This project will result in the establishment of a permanent monitoring network that will provide real-time air quality data to the community. Additionally, this project will significantly advance the existing partnership between the tribal nations and Clarkson University and enable the two-way transfer of knowledge of air quality, pollution sources, and community concerns and their efforts to mitigate observed problems.

The successful completion of this proposal will result in a permanent low-cost sensor network whose data is used by the community to ensure that pollutant concentrations in the air does not exceed federally recommended standards. The tribal nation participating in this project has unique

pollution sources and there is community suspicion about these sources and the lack of data results in doubts and concerns that we can alleviate with the proposed project. With the proposed intensive community engagement program, we expect the project findings to be impactful and with active involvement of air quality experts from Clarkson University the community will be encouraged to arrive at solutions that are implementable.

Section 2: Community Involvement

Community Partnerships:

The project will bring Saint Regis Mohawk Tribe and Clarkson University faculty and students together to setup a low-cost sensors network for air quality monitoring and establish a partnership to enable community-engaged air quality management. SRMT has extensive experience in air quality monitoring and air quality issues affecting them.

The lead partner, Saint Regis Mohawk Tribe, will be responsible for the overall management of the project, including coordinating meetings between the partners, installation of sensors, coordinating approval of dissemination of results to the community through the web-site and town hall meetings. Clarkson University will provide expertise for sensor selection, field deployment, and data interpretation. Clarkson University will also provide training for a technician to manage the sensor network, including basic analysis of the monitoring data. Clarkson University will also aid in developing a dashboard for data presentation to the community.

Saint Regis Mohawk Tribe and Clarkson University have a long-term relationship that will be continued through this project. Clarkson's participation in this project is consistent with the University's commitment to improve the lives of people in the local community. As the partners will all benefit from continuing this project, all effort will be made to finding support to continue this project.

B. **Community Engagement:**

Community engagement will be at the center of all the tasks in the project. The sensor location sites will be selected with community input and the sensor deployment will be accompanied with significant community advertisement and informational effort. During the project, real-time data will be made available to all the communities through a dashboard that will be developed in collaboration with TelosAir. In addition, the project PI will conduct several townhall meetings, in the community, (at the beginning of the project; and every 6 months after that) to help interpret the data to the community and drive discussion on mitigation efforts.

Section 3 –Environmental Justice and Underserved Communities:

The concern about air quality and associated health effects has been magnified with the recognition that the extent of COVID infection risk and disease severity was related to exposure to ambient air pollution. With the tribal population genetically predisposed to some chronic diseases such as diabetes and blood pressure, minimizing health risk under future pandemic scenarios requires addressing air pollution exposure. Even before COVID, US EPA's Environmental Justice (EJ) indicators suggest that the 3 Tribal Nations are in the top percentile for air pollution exposure (PM2.5 and Ozone) and health (Air Toxics Cancer Risk and Air Toxics Respirator Health Index). The EJ indicators are significantly worse for the Nations than the neighboring areas.

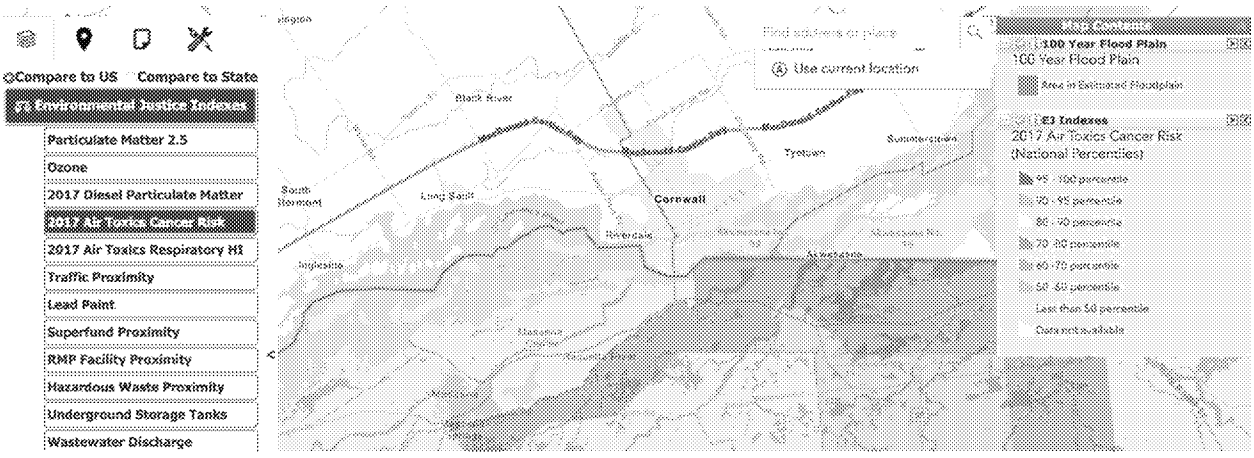


Figure 4: Screenshot of EJScreen view of Environmental Justice Indexes for Saint Regis Mohawk Tribe showing a high percentile for Air Toxics Cancer Risk.

The EJ problems are compounded by the lack of continuous and consistent air quality monitoring data in these communities is an environmental justice problem and this proposal aims to first alleviate this issue. The development of information material to bring awareness to the observed air quality issues in the community and the proposal of mitigation measures to the community through townhalls, we will empower the community to address the EJ issue associated with poor air quality.

Section 4–Environmental Results—Outcomes, Outputs and Performance Measures

A. Expected Project Outputs and Outcomes

The project outputs include: Deployment of a distributed, low-cost monitoring system that can provide real-time data on PM2.5, CO, O3, NO2, and VOCs that will be available to the community through a responsive dashboard. The PI will assist the communities to assess their air pollution data and identify air pollution sources. Town Hall meetings to promote community involvement and inform the community about the data assessments. Regular progress reports and a final report will summarize the monitoring data.

The outcomes from the project will include:

1) Increased community awareness about air quality issues in their neighborhood through real-time access of data via a dashboard and regular town hall presentations summarizing sources identified.
2) Increase the technical expertise of the environmental personnel on air quality issues, monitoring tools, data analysis tools, and enhanced community involvement.
3) Town hall presentation of measures that the community members can take to minimize exposure to pollutants.
4) Present measures that can be deployed to reduce or eliminate identified pollutant emissions or reduce exposure to the pollutants
5) Identify possible State or local policy actions that can help minimize problematic emissions

B. Performance Measures and Plan

The project progress and success will be continuously evaluated based on several performance measures including: data access, data quality, community engagement, and development of long-term mitigation plans. Additional detail about these measures is listed below:

1) Sensor network: We will evaluate the sensor network status on a regular basis to determine if the maintenance plan is resulting in robust collection and access to real-time data from all sensor units.
2) Data quality: We will evaluate the data to ensure that the measurements are precise and accurate. The data quality check will be made by two approaches. First, data from each sensor will be automatically evaluated every week by inter-comparison with data from other sensors in the network. Second, some sensors in the network will be evaluated by comparison with measurements made with two "standard" units. The standard units will be units identical to the field units, that will be regularly calibrated in the lab. The co-location will be done every 6 months.
3) Community engagement: A critical measure of project success will be the level of engagement with the community. The number of community members we engage in the townhall meetings and the quality of the engagement will be tracked and reviewed in the project meetings to evaluate the engagement level and design measures to improve it, if necessary.
4) Long-term plans: Throughout the project period, we will build plans for long-term continuation of the monitoring network and development of mitigation plans for air pollutants of concern observed during the project. Successful completion of the project of this project will be accompanied by a well thought out community led plan to develop local policies to mitigate the observed air pollutants of concern and identification of support for continued monitoring at the different sites.

C. Timeline and Milestones

Task	Months												
	1	3	6	9	12	15	18	21	24	27	30	33	36
1) Partner meetings (monthly)	x	x	x	x	x	x	x	x	x	x	x	x	x
2) QAPP Development and approval	x	x											
3) Community meetings for determining sensor deployment locations		x	x										
4) Sensor procurement	x	x											
5) Sensor lab testing for precision evaluation		x											
6) Establishment and refinement of data dashboard for real-time community access	x	x	x	x	x	x	x	x	x	x	x		
7) Intensives for sensor accuracy testing		x	x		x				x				x
8) Sensor deployment			x	x									
9) Town hall meetings			x		x		x		x		x		x
10) Reports					x				x				x

Section 5-Quality Assurance Statement

The Environment Division of the St. Regis Mohawk Tribe is strongly committed to good science and EPA-approved quality assurance (QA) practices. This commitment complements the US EPA's own emphasis given to a comprehensive and coordinated QA program.

The Quality Assurance Management Plan (QAMP) describes the Environment Division's QA program. Its objectives are to clearly delineate the Environment Division's QA policy and management structure that will be used to implement the QA strategy and the QA monitoring requirements necessary to document the reliability and validity of environmental data.
The Environment Division is committed to sufficient QA activities being conducted within the Division to insure that all environmental data generated and processed will be scientifically valid, of known precision and accuracy, of acceptable completeness, representativeness, and comparability and where appropriate, legally defensible.

Before the deployment of the monitoring network, we will develop a Quality Assurance Project Plan (QAPP) outlining our data quality objectives. The SRMT has extensive air monitoring experience and currently operates an air quality monitoring site (AQS site No. 36-033-7003) at which NO_X, NO, NO_2, O_3, SO_2, and $PM_{2.5}$ are measured. Thus, there is significant experience in QA/QC in terms of routine calibration, flow checks, etc. in operating routine monitoring systems. Other collaborators do not currently have air quality monitoring activities and thus, we will develop training materials, check lists, and related documents and forms to provide a uniform approach to monitor operations and related upkeep, checks, and addressing any problems that might arise. It will not be possible to calibrate these monitoring systems in the field. Thus, we will have 2 spare monitoring systems that can be periodically calibrated and then rotated among the field sites for several days to a week at a time to provide the data needed to update the calibrations for the field sites and identify any sensor issues. In addition, the data are collected regularly through their internet connections and routine data assessment and validation approaches will be applied to provide early detection of problems that arise with any of the sensor units. The spare units can provide temporary replacements while defective systems are repaired, recalibrated, and then put back in service. Angela Benedict will serve as the QA manager of the project. Ms. Benedict has served as the quality assurance manager for the SRMT for over 15 years and has had many trainings through EPA and private companies such as Region 5 QA/QC training in 2019 and Sampling for Environmental Decisions through Envirostat. In addition, Dr. Philip Hopke will provide additional assistance. Dr. Hopke has previously served as the QA manager of the EPA Baltimore Supersite and the Clarkson activities in the Great Lakes Fish Monitoring and Surveillance Program. Thus, we believe will provide sufficient QA/QC support and oversight to ensure that the resulting data and information provided to the participating nations will be reliable and accurate.

Section 6–Programmatic Capability and Past Performance
Past Performance: On September 19, 2000, May 25, 2001 and March 5, 2003 letters signed by the Regional Administrator for the US Environmental Protection Agency (US EPA) announced the approval for the St. Regis Mohawk Tribe's request for *Eligibility Determination for the St. Regis Mohawk Tribe for Treatment in the Same Manner as a State Under the Clean Air Act.* In the letter, the US EPA Region 2 Office of Regional Counsel (ORC) and the Division of Environmental Planning and Protection (DEPP) determined the SRMT met the criteria at 40 CFR 49.6;
(1)The applicant is an Indian Tribe recognized by the Secretary of the Interior;

(2)The Indian Tribe has a governing body carrying out substantial governmental duties and functions;
(3)The functions to be exercised by the Indian Tribe pertain to the management and protection of air resources within the exterior boundaries of the reservation or other areas within the Tribe's jurisdiction.
The Indian Tribe is reasonably expected to be capable, in the EPA Regional Administrator's judgment of carrying out the functions to be exercised in a manner consistent with the terms and purposes of the CAA and all applicable regulations. For the past 10+ years the SRMT has been carrying out grants under a 5-year performance partnership grant (PPG). Under this PPG report and management functions are outlined.

The Tribe's Environment Division (Division) is entering into its fourth PPA/PPG with EPA. A PPA/PPG is an instrument by which EPA provides financial assistance to Tribes for assistance in planning, developing and implementing environmental programs. Through the PPA/PPG funding is provided through streamlined administrative requirements, giving the Tribe greater flexibility to direct resources to the most pressing environmental problems and to make it easier to fund efforts that cutacross program boundaries. All tribal grants, including PPGs, are governed by 40 CFR 35, Subpart B—Environmental Program Grants for Tribes (commonly referred to as Part 35).The Tribe has a well-established mutual relationship with EPA that has enabled it to reach critical environmental goals. Early on in this relationship the Tribe and EPA worked toward program development, the result of which has been the capacity of the Tribe to protect environmental health through strategic planning, staff administrative and technical development and environmental data collection and analysis. Early programs such as the Air Quality Program and the Water Resources Program have matured to the point where they reached implementation capacity through Treatment as States (TAS) designations.

VW Settlement funds were received through Wilmington Trust in the total amount of $697,145 over the past 3 years. Funds were allocated to replace old diesel vehicles with newer cleaner ones. The funds were also used to install an electric vehicle charging infrastructure in Akwesasne. Reports were submitted through an online dashboard every 6 months and a final report was submitted when each of the funding requests were completed.

A. Reporting Requirements
The SRMT environment division has had a long record of receiving grants through lots of different agencies. For over 30 years, the SRMT air quality program has not had any problems with timely reports whether it be quarterly, mid-year, yearly or final reports. All reports have been accepted and award monies have always been adequately and timely spent. The final technical reports have always been acceptable.

B. Staff Expertise
Ms. Benedict is a tribal member and has worked for the SRMT ED for over 26 years in various disciplines. Ms. Benedict has been working for the air quality program for over 22 years and the program manager for 20 years. Ms. Benedict holds an Associate Degree in Math/Science from North Country Community College. Ms. Benedict has successfully managed several grants from the US EPA for the past 20 years totaling well over 5 million in the form of program funds and special projects totaling over 4 million through the US EPA.

Dr. Suresh Dhaniyala is the Bayard D. Clarkson Distinguished Professor of Mechanical & Aeronautical Engineering and the Co-Director of the Center for Air and Aquatic Resources Engineering and Sciences (CAARES) at Clarkson University. Dr. Dhaniyala's technical expertise is in fundamental aerosol science, with a particular focus on sensor networks and data analytics, design and development of novel air quality and bioaerosol sensors, aerosol fate and transport modeling, and atmospheric aerosol characterization. He serves on the Editorial Board of Aerosol Science and Technology (AST) and on the UN committee for safety of Mars sample return.

Dr. Andrea Ferro is Andrea Ferro is a professor in the Department of Civil and Environmental Engineering and Associate Director for Research of the Institute for a Sustainable Environment (ISE) at Clarkson University. Dr. Ferro's technical expertise is focused on indoor air quality and human exposure to particulate pollutants using direct measurement as well as mechanistic and stochastic models. She has conducted multiple studies with community participants, including studies for asthma intervention, wood burning appliance exposure, and vehicle-related PM exposure associated with a major international bridge crossing. She has partnered with the Saint Regis Mohawk (Akwesasne) Tribe on multiple indoor and outdoor air quality investigations and intervention programs.

Budget

Line Item & Itemized Cost	EPA Funding
Personnel	
(1) Project Manager @$36.41/hr x 4 hrs/wk x 156 wks + Perf Incentive	$23,856
(2) Project Staff @ $ 29.84/hr x 20 hrs/wk x 156 wks	$93,101
TOTAL PERSONNEL	$116,957
Fringe Benefits	
Based on actual benefits - Retirement, Health Benefits, FICA, SUI	$20,469
TOTAL FRINGE BENEFITS	$20,469
Travel	
Mileage for PM: 504 miles @ $.0.545/mi	$275
Mileage for Staff: 3,400 miles @ $.545/mi	$1,853
Out of town	$1,372
TOTAL TRAVEL	$3,500
Equipment	
25 Low-Cost Sensors @ $1,500/unit	$37,500
TOTAL EQUIPMENT	$37,500
Supplies	
Outreach Materials and Supplies $500/year	$1,500
Computer @ $2,500/unit + $1,700 Software	$4,200
TOTAL SUPPLIES	$5,700
Contractual	
Support Services Contract	$149,500
TOTAL CONTRACTUAL	$149,500
Other	$1,000
Rent	$5,086
Community Meeting Logistics	$4,500
TOTAL OTHER	$10,586

Indirect Charges	
Federal Indirect Cost Rate x Personnel = Indirect Costs (Federal Negotiated Indirect Cost Rate = 20.59%)	$37,517
TOTAL INDIRECT	$37,517
TOTAL FUNDING	**$381,729**
TOTAL PROJECT COST[***]	**$381,729**

A. Budget Detail

Personnel: Program Manager-Oversee project, budgets and reporting requirements. 208 hours each year for 3 years.

Program Staff-Employed with SRMT as a per diem staff to install and maintain sensor network in Akwesasne. 1040 hours allocated throughout each year for 3 years.

Fringe benefits are calculated from actual costs which include workmen's compensation, disability insurance, health insurance, FICA, SUTA, FUTA, employee pension expense, life insurance and accrued paid leave expenses.

Contract will be awarded in conjunction with the SRMT procurement policy. Contract will be done for expertise in sensor development and deployment.

Equipment: Each sensor with all probes will be $1,500 each. 25 sensors will be purchased and deployed throughout Akwesasne. Costs include dashboard access for community.

Supplies will include log books, pens, paper along with any supplies need for town hall meetings with community. $500 per year with a total of $1,500 for the 3 years.

A laptop computer will need to be purchased to technician to perform duties associated with the project. Total of laptop with all software will cost $4,200

Travel will be for preparing sites throughout Akwesasne, sensor design and deploying sensors. Travel will also include any training needed for sensor implementation.

Other: Rent will be for space at the Environment Division offices to perform paperwork, computer access and any other office duties. Rent is not included in indirect.

Community meeting logistics as in advertising, space rental, printing and photocopying. $750 per meeting 6 meetings total. Also included in other is printing of the data analysis for the community in a report to explain what the data means.

B. Expenditure of Awarded Funds

The SRMT has been receiving funding allocations for many years. As one of the most advanced nations in the country, all procedures are in place for procurement and accounting.

The finance office has a very strict policy adhering to federal standards for utilizing grant funds.